WHEELING

STEEL FLOOR AND ROOF SYSTEMS

Wheeling
CORRUGATING COMPANY

WHEELING CORRUGATING COMPANY
WHEELING, W. VA.

WHEELING LONG-SPAN

STEEL FLOOR AND ROOF SYSTEM

WHEELING LONG-SPAN Steel Floor and Roof System is a lightweight, long-span system of steel floor and roof construction, which combines high strength with low cost.

THE UNIT

The basic unit of the WHEELING LONG-SPAN Steel Floor and Roof System is a channel-shaped joist whose top flange is considerably wider than the bottom flange. These joists are available in depths of 5″, 6″, and 8″, and 14 gauge steel.

A shelf, about 1½″ in width and equal in depth to the thickness of the metal, is provided at the top of all joists directly over the web, for the purpose of providing a shelf for the reception of the edge of the top flange of adjacent joists.

As each joist is laid, the edge of the top flange is supported by the above mentioned shelf of the adjacent joist, and welded to it with welds ½″ long, and spaced at 6″ intervals for the entire length. The result is a series of correctly spaced joists, completely welded together to form an integral unit. A smooth level floor or roof surface of solid steel is thereby provided, ready to receive any desired type of floor or roof finish.

ECONOMY

The use of WHEELING LONG-SPAN Steel Floor and Roof System shortens the time required to complete a particular project due to the fact that a safe floor is provided for other trades immediately after the floor or roof has been installed. Ordinary delays, such as those caused by the use of temporary planking or waiting for concrete to set, are entirely eliminated. Manufactured in lengths capable of spanning the distance from girder to girder or from truss to truss, the use of intermediate beams and purlins is entirely eliminated, thereby reducing the cost of the structural steel frame work considerably.

The cost of WHEELING LONG-SPAN Steel Floor and Roof System will be found to be lower than other types of fireproof floor and roof constructions.

ADAPTABILITY

Any type of finished floor may be applied to the WHEELING LONG-SPAN Steel Floor and Roof System. Metal Lath may be applied directly to the underside of the joists for ceiling construction by means of lath clips furnished for this purpose by the Wheeling Corrugating Company.

SAFEGUARDED AGAINST CORROSION

After fabrication, each unit receives a dip coat of high-quality protective asphalt paint as a protection against corrosion.

The following pages illustrate a few typical installations of the WHEELING LONG-SPAN Steel Floor and Roof System, and contain all the technical data necessary to properly design a floor or roof.

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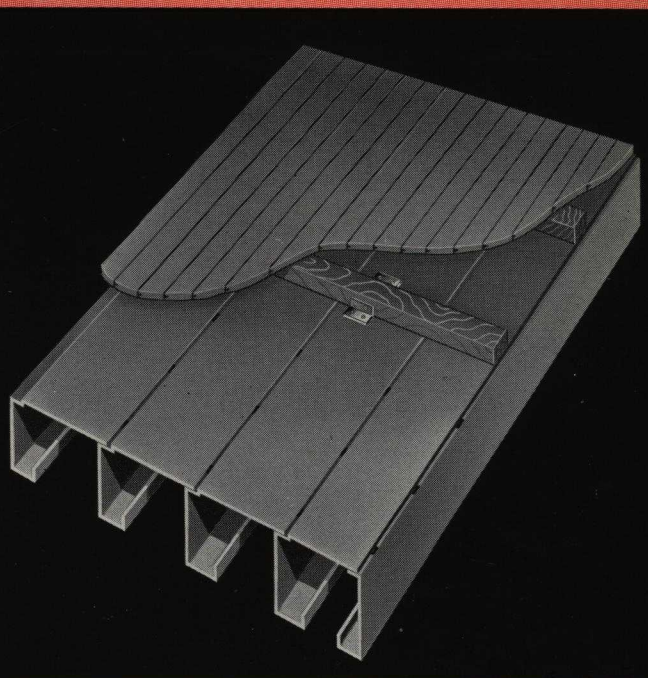
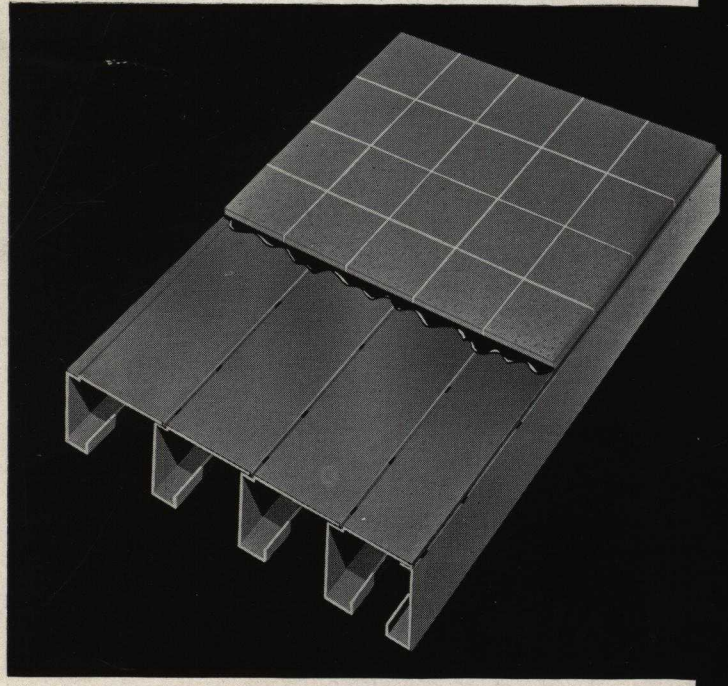
WOOD FLOOR

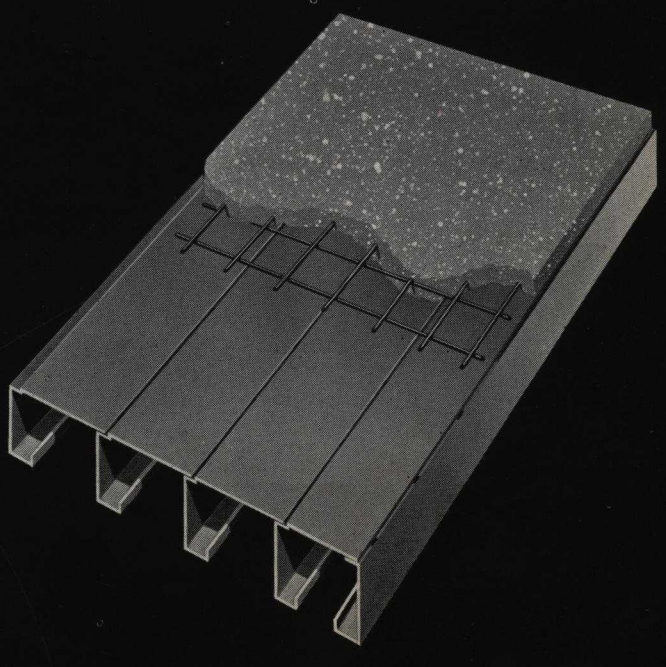
Screed Clips are welded or attached to steel floor plate with self-tapping screws. The wood screed is then nailed to the projecting (O.S. flange) flange of the clip, and the flooring is then nailed to the wood screed.





TILE BLOCK FLOOR

A composition filler is first applied to the steel floor plate in accordance with Tile Manufacturers' Specifications. After filler is screeded to produce a smooth level surface the floor tile is laid.



CONCRETE AND TERRAZZO FINISH

The concrete is poured on the steel floor plate and screeded to a smooth level surface. Floor Hardener or Composition is then applied in accordance with the manufacturer's specification.

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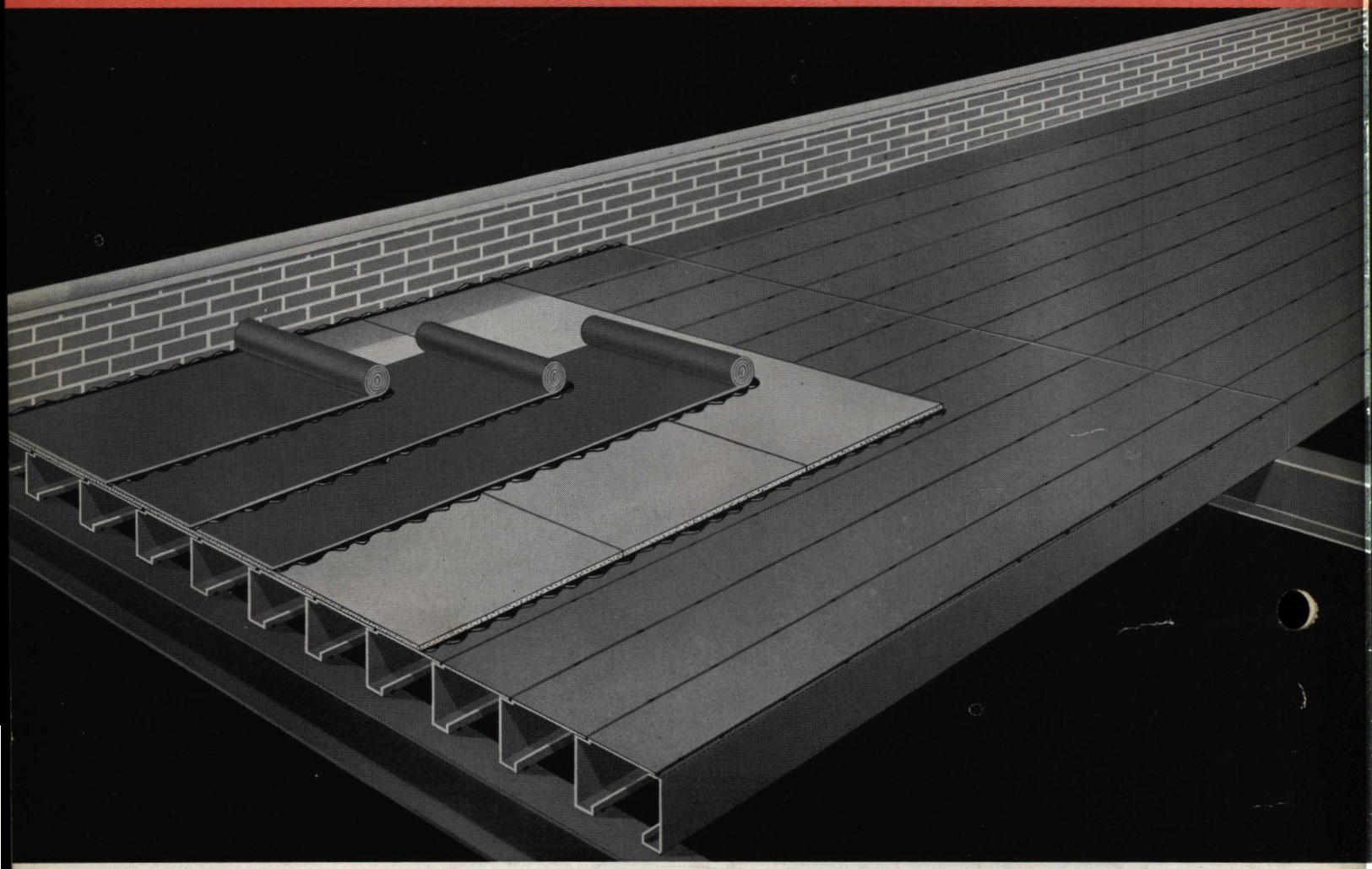
STEEL FLOOR AND ROOF SYSTEM



After the joists are erected in place, both ends are welded to the steel supports or attached to the supports with a drive screw. Where the joists bear on masonry walls, a steel plate is set on the masonry and the joists welded to the plate. Joists are also anchored to the masonry every four feet.

When Wheeling Long-Span System is used as a Roof Deck, purlins are not necessary. The deck itself will span from girder to girder without intermediate supports. The finished deck provides an exceptionally smooth surface to receive the insulation and built-up roof.

WHEELING LONG-SPAN

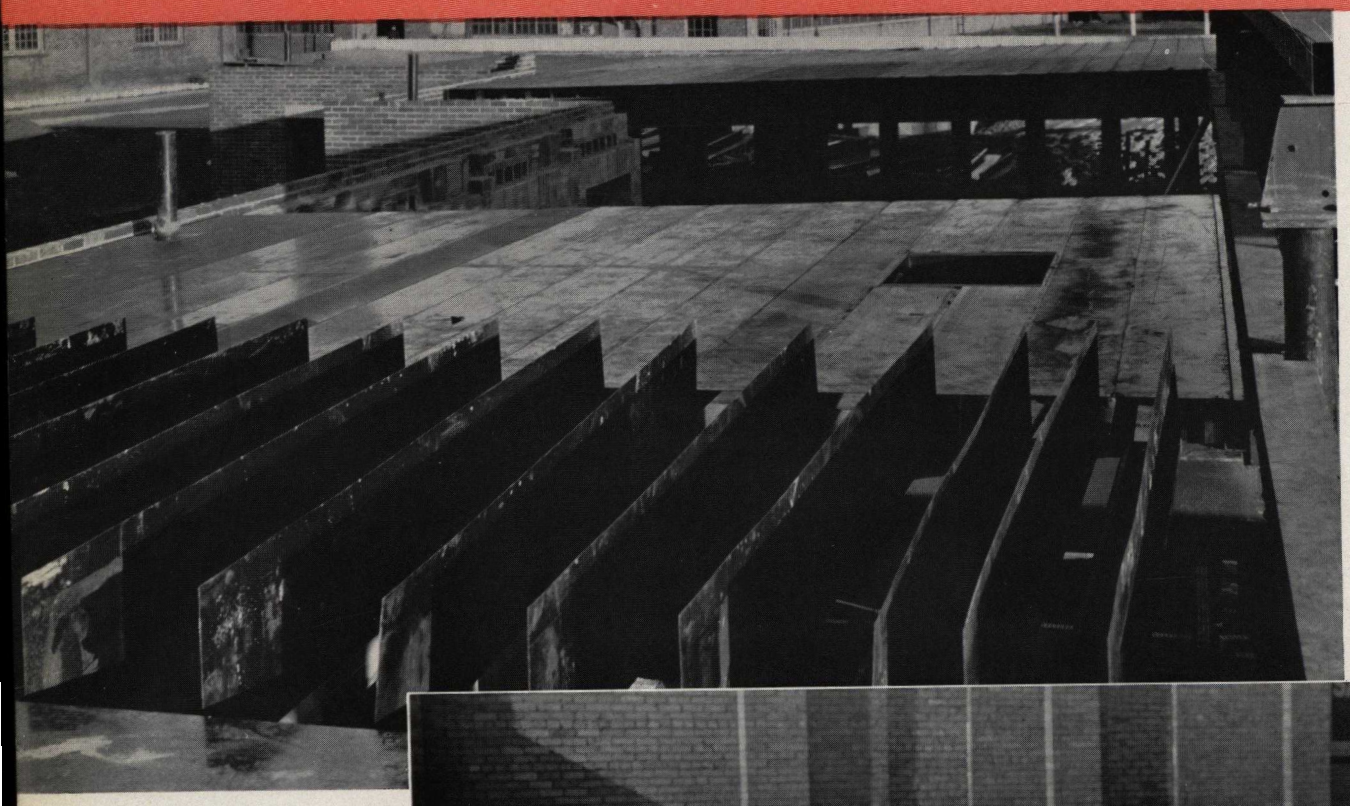
STEEL FLOOR AND ROOF SYSTEM

The above illustration emphasizes the flexibility of Long-Span Floor. These spiral ramps would be very difficult to build with any other type of fireproof floor.

Floors and roofs, also ramps, throughout this building are Wheeling Long-Span System. Note the simplicity of detail in installing the ramp floors and the circular roof.

WHEELING LONG-SPAN

STEEL FLOOR AND ROOF SYSTEM



The joists are hoisted to the proper floor and distributed to their various locations. Joists are first welded to the main supporting members, then welded together at the seams, thus permitting the operator to work trom the top at all times. The speed with which this operation is done permits the other trades to move in and start work immediately, thus speeding up the whole job.

Complicated detailed erection drawings are not necessary. All parts are factory-made, resulting in a finished job which does not depend entirely on the skill of the individual workman.

WHEELING LONG-SPAN

STEEL FLOOR AND ROOF SYSTEM

After the floor is welded in place it provides a clear platform on which the various trades can work. There is no debris to clean up.

Plumbers, steamfitters, electricians, and others can set up their benches and proceed with rough-ing in work immediately after the joists are welded in place. Material storage is no problem where Wheeling Long-Span System is used.

WHEELING LONG-SPAN

STEEL FLOOR AND ROOF SYSTEM

It is interesting to note how the Wheeling Long-Span System is used as a working platform and material storage space for the masons —storage of brick, stone, windows, etc. Work of all trades proceeds uninterrupted. This working platform can be made ready almost as fast as the steel frame of the building is erected.

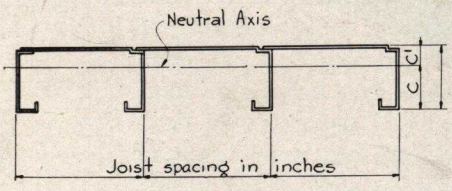
If necessary, work of other trades can proceed on a portion of the floor while floor joists are being placed and welded on another portion.

WHEELING LONG-SPAN

STEEL FLOOR AND ROOF SYSTEM

SAFE UNIFORM LOADS PER SQUARE FOOT INCLUDING DEAD LOAD OF DECK

D	Gauge	Joist Sp'g	M	CS	SPAN IN FEET								Wt. Per Sq. Ft.		
					11	12	13	14	15	16	17	18	Lbs.	C	C′
5″	14	6	46000	30700	252	191	152	122	98				8.10	2.73″	2.27″
		8	34500	23000	189	143	104	91	73				6.84		
		10	27600	18400	151	115	91	73	58				6.10		
		12	23000	15300	126	96	76	61	49				5.61		
		14	19700	13100	[95]	82	65	52	42				5.35		
6″	14	6	59400	39500			232	186	152	124	104	82	8.60	3.22″	2.78″
		8	44600	29700			174	139	113	93	78	61	7.21		
		10	35700	23700			139	111	91	74	62	49	6.43		
		12	29700	19700			116	93	76	62	52	41	5.86		
		14	25500	17000			[95]	79	65	53	44		5.59		
8″	14	6	90000	60000						234	208	176	9.62	4.55″	3.45″
		8	67600	45100						176	156	132	8.03		
		10	54000	36000						140	124	105	7.04		
		12	45000	30000						117	103	88	6.39		
		14	38600	25700						[95]	89	75	6.05		



M=Resisting moment per foot width of floor (fs=16000#□″)

CS=Coefficient of strength per foot width of floor.

Loads underscored in with heavy line thus 176 are determined by maximum bending stress.

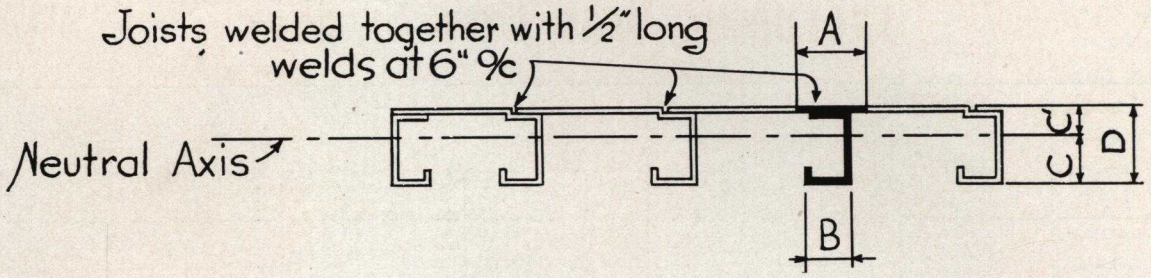
Loads enclosed in heavy lines thus [95] are governed by strength of top plate in bending. All other loads are calculated to produce a maximum deflection of $\frac{1}{360}$ of the span length.

Where deflection is not a governing factor, safe load per square foot may be obtained by dividing CS by (span in ft.)^2

WHEELING LONG-SPAN

STEEL FLOOR AND ROOF SYSTEM

PROPERTIES OF WHEELING LONG-SPAN JOISTS



fs = 16,000 lbs. per sq. in.

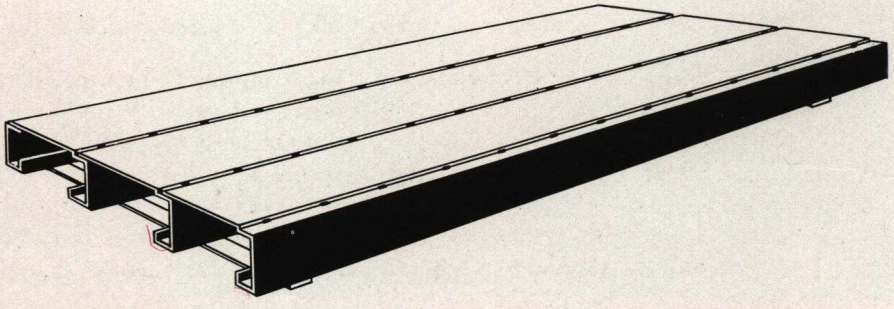
D	Gauge	I	I/C	Resisting mom. in. inch pounds	C	C1	B	Effective Width A	Safe end reaction per joist		
									2½" Bearing	3" Bearing	3½" Bearing
5"	14	3.94	1.44	23000	2.73"	2.27"	2⅞"	4"	3120	3540	3960
6"	14	6.02	1.86	29700	3.22"	2.78"	3"	4"	2810	3160	3510
8"	14	12.81	2.81	45000	4.55"	3.45"	3"	5.25"	2280	2540	2780

Safe end reactions are based on web buckling or shear, whichever is least.

Unit Shear where (D—2t) = 60 or less = 12000 lbs. per sq. in. where (D—2t) exceeds 60 unit shear = $\dfrac{18{,}000}{1 + \dfrac{1}{7200}\left[\dfrac{(D-2t)}{t}\right]^2}$ t = Ga. of Metal

Unit buckling stress $\dfrac{18000}{1 + \dfrac{1}{6000}\left(\dfrac{D}{t}\right)^2}$

SHIPPING



Units can be shipped in one piece or two or more units can be welded together at the factory, thereby reducing the number of field welds required. When two or more units are factory welded together bottom flanges are stayed by two or more rows of ⅛"x1" flats welded to each joist.

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STEEL FLOOR AND ROOF SYSTEM

GENERAL

1. Where Wheeling Long-Span Steel Floor construction is specified, it shall be understood to mean Wheeling Long-Span Steel Floor System Joists of the size and spacing as shown or called for on the drawings or properly to support the dead load plus the specified live load.

MATERIALS

2. The Wheeling Long-Span Steel Floor Joists shall be made of hot rolled steel sheets, having an ultimate tensile strength of from 45,000 to 60,000 lbs. per square inch, and an elastic limit equal to 50% of the ultimate tensile strength.

FORMING

3. Wheeling Long-Span Steel Floor Joists shall be cold formed either in a rolling machine or press.

SPACING

4. The spacing of Wheeling Long-Span Steel Floor Joists shall conform to the spacing specified on the drawings. However, a variation in spacing up to ½ inch shall be allowed to provide for irregularities in the construction of the building.

PAINTING

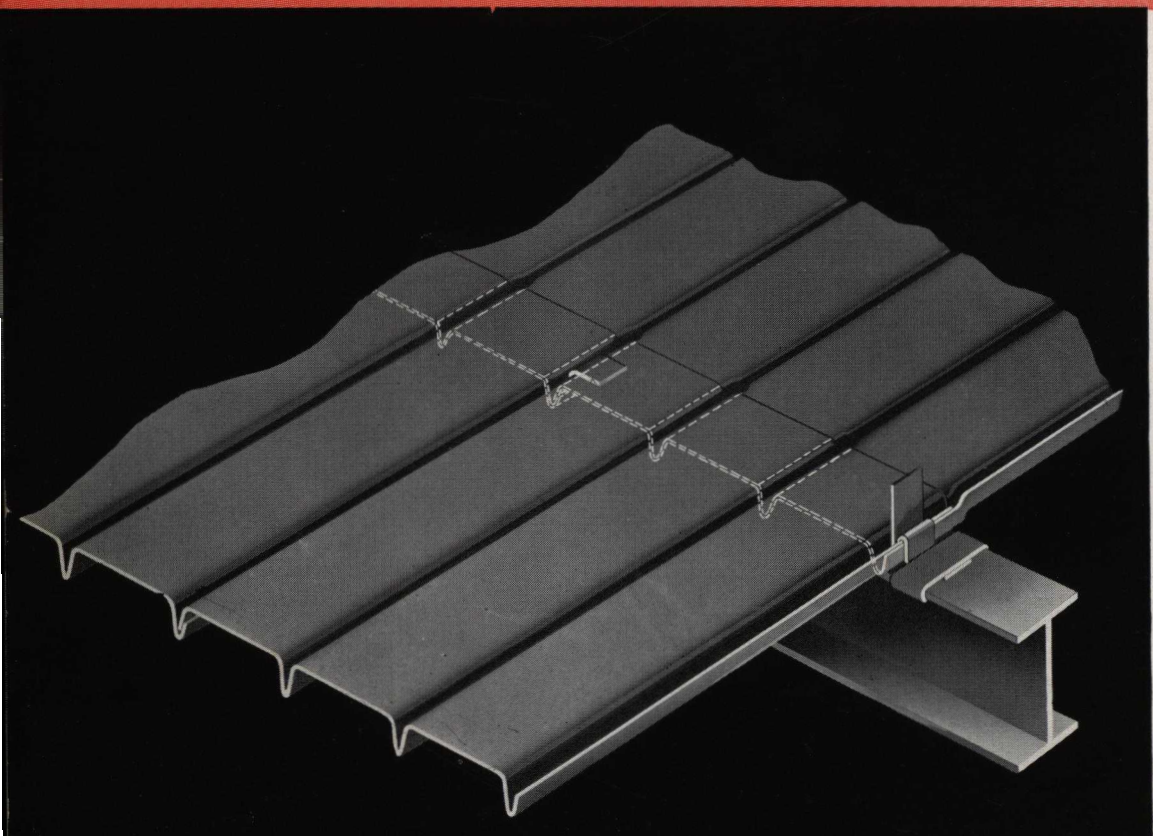
5. All Wheeling Long-Span Steel Floor Joists shall be spray painted or dipped with one good shop coat of high quality metal protective paint before shipment. After erection and welding, all joists shall be touched up with a coat of black asphalt paint wherever the factory coating has been damaged by welding or rough handling.

ERECTION

6. All Wheeling Long-Span Steel Floor Joists shall have a minimum bearing of four (4″) inches on concrete or masonry and two and one-half (2½″) inches on steel. Where joists bear on concrete or masonry, a steel plate four (4″) inches wide by one-fourth (¼″) inch thick shall run continuously along the wall upon which all joists shall bear. After this plate has been properly leveled, all joists shall be welded to this plate with one (1) weld at each end, each one-half (½″) inch long. Joists shall be anchored to concrete or masonry support every four (4′) feet with an anchor. The top flange of each joist shall be welded to the top flange of the adjacent joist at six (6″) inch intervals, the length of these welds to be at least one-half (½″) inch long. Where joists bear on steel beams, the ends of all joists shall be welded to the steel beams with one (1) weld at each end, each one-half (½″) inch long. All joists shall be secured in place and the top deck welded together before any construction loads, except the weight of the necessary workmen and equipment to do this welding, is placed upon the joists.

WHEELING TRI-RIB

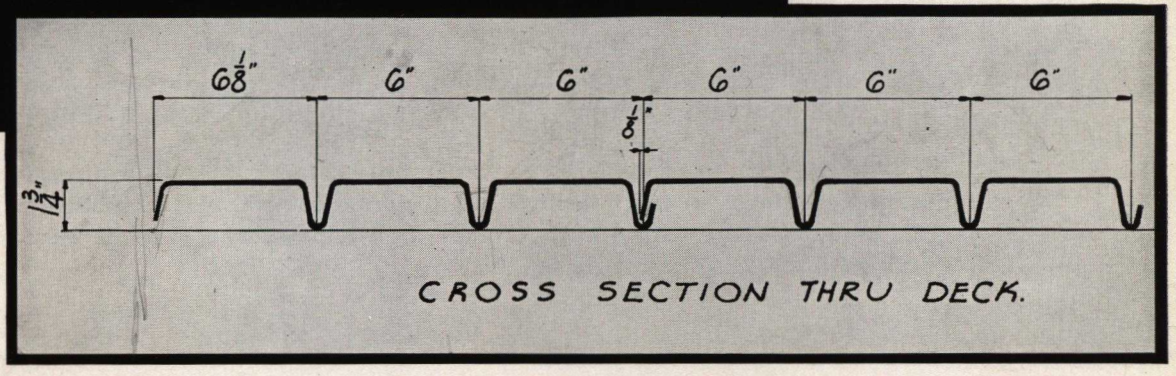
STEEL ROOF DECKS



Tri-Rib Roof Deck is furnished in lengths to take care of any spacing of purlins. The plates are 18″ wide with 1¾″ ribs spaced 6″ on centers. The deck is furnished in 18, 20 and 22 gauge.

Tri-Rib Roof Deck is fabricated from COP-R-LOY and is given one shop coat of good grade paint. Can also be fabricated from galvanized sheets.

Tri-Rib Roof Deck may be welded to the purlins if desired, thus eliminating the use of purlin clips. Illustration on the left shows the purlin clip in place, also the intermediate clip.



CROSS SECTION THRU DECK.

1. Engineered to the job, no cutting or fitting required.
2. Easy and economical to erect. All erection operations are performed from the top of the deck.
3. All deck units are eighteen inches wide, thus reducing to a minimum the number of units to be erected.
4. Minimum end laps of four inches insure a rigid even surface throughout.
5. Designed for easy assembly of all units, overlapping ends never have to be forced in place.
6. Made from COP-R-LOY painted or galvanized, thereby insuring extra long life to the steel deck.

WHEELING TRI-RIB

STEEL ROOF DECKS

1. PURLIN CLIP
Upper Left

For attaching roof deck to beam, channel, or joist purlins. Detail on page 12 shows this clip in use.

2. INTERMEDIATE CLIP
Upper Right

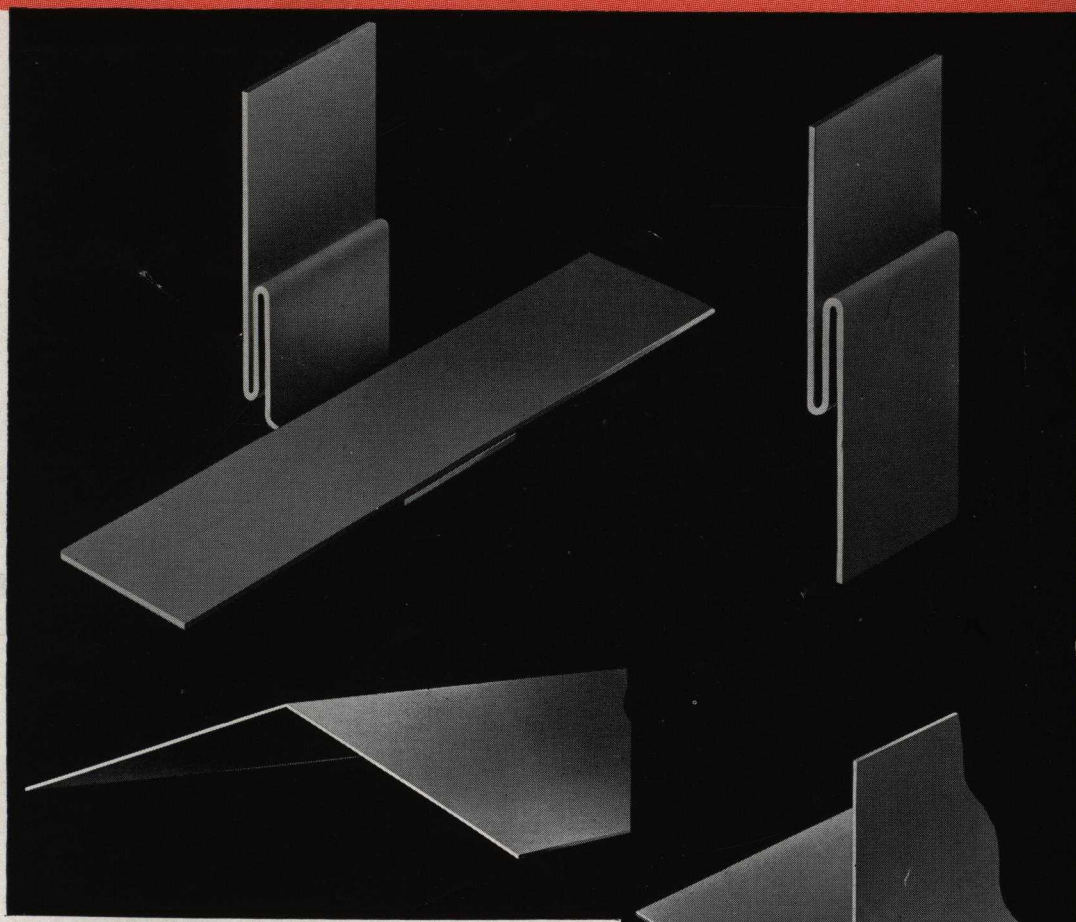
This clip is used between supports to tie the sides of roof deck plates together. Detail below shows this clip in use.

3. HIP OR VALLEY PLATE
Center Left

Fastened to the roof deck plates with self-tapping screws closes the space between the ends of the deck plates and makes a continuous roof surface.

4. SIDEWALL PLATE
Center Right

This plate is used for closing the space between the wall and the roof deck plate and runs parallel to the span of the roof deck plates.



SAFE, UNIFORM LOAD PER SQUARE FOOT

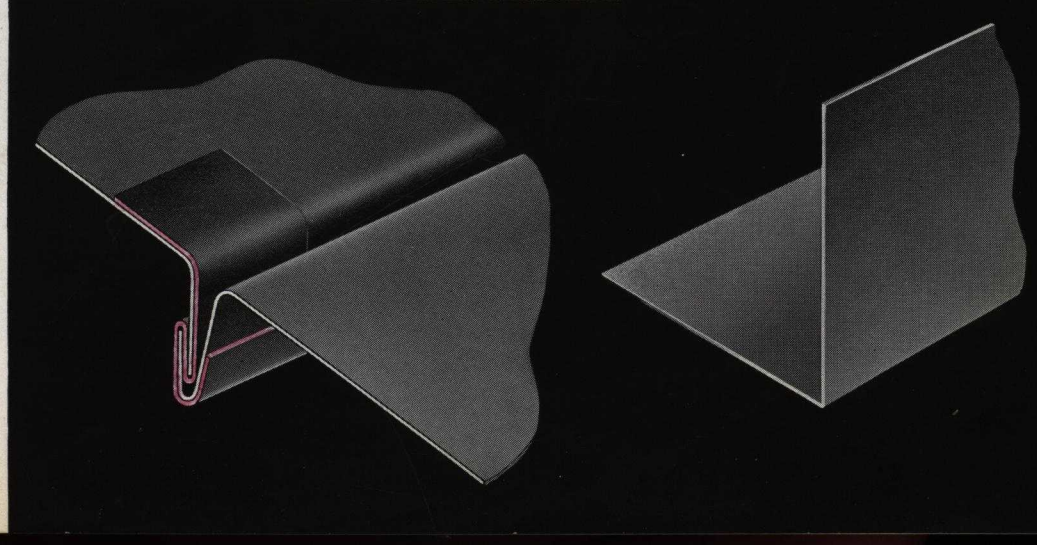
Span	22 Ga.	20 Ga.	18 Ga.
4′-0″	110	125	
5′-0″	72	85	110
6′-0″	48	57	75
7′-0″		40	55
8′-0″			40

5. Lower Left

Illustration of the intermediate clip in use.

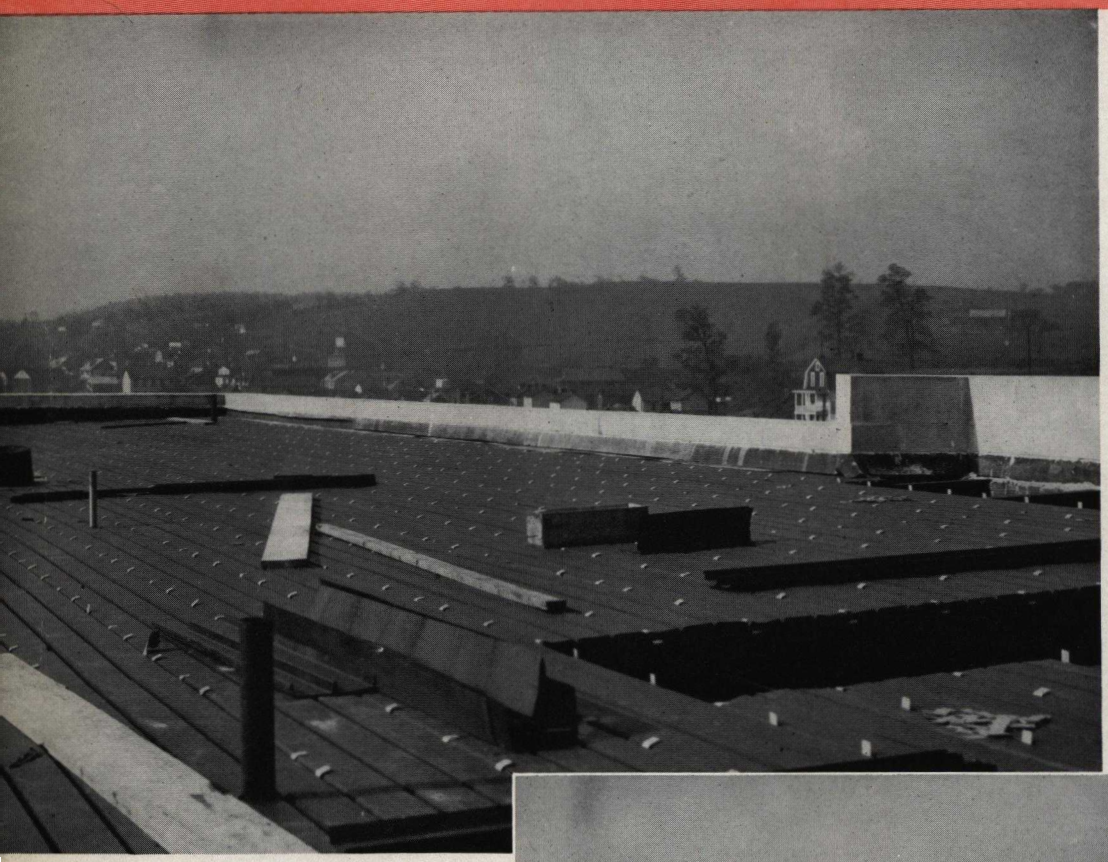
6. END WALL PLATE
Lower Right

Used for a purpose similar to the sidewall plate. This plate closes the space between the end of the roof deck plate and the wall. Both side and end wall plates are attached to the roof deck plates with self-tapping screws.



WHEELING TRI-RIB

STEEL ROOF DECKS



Wheeling Tri-Rib Roof Deck on a modern school building. Deck is erected in place ready for insulation and built up roofing.

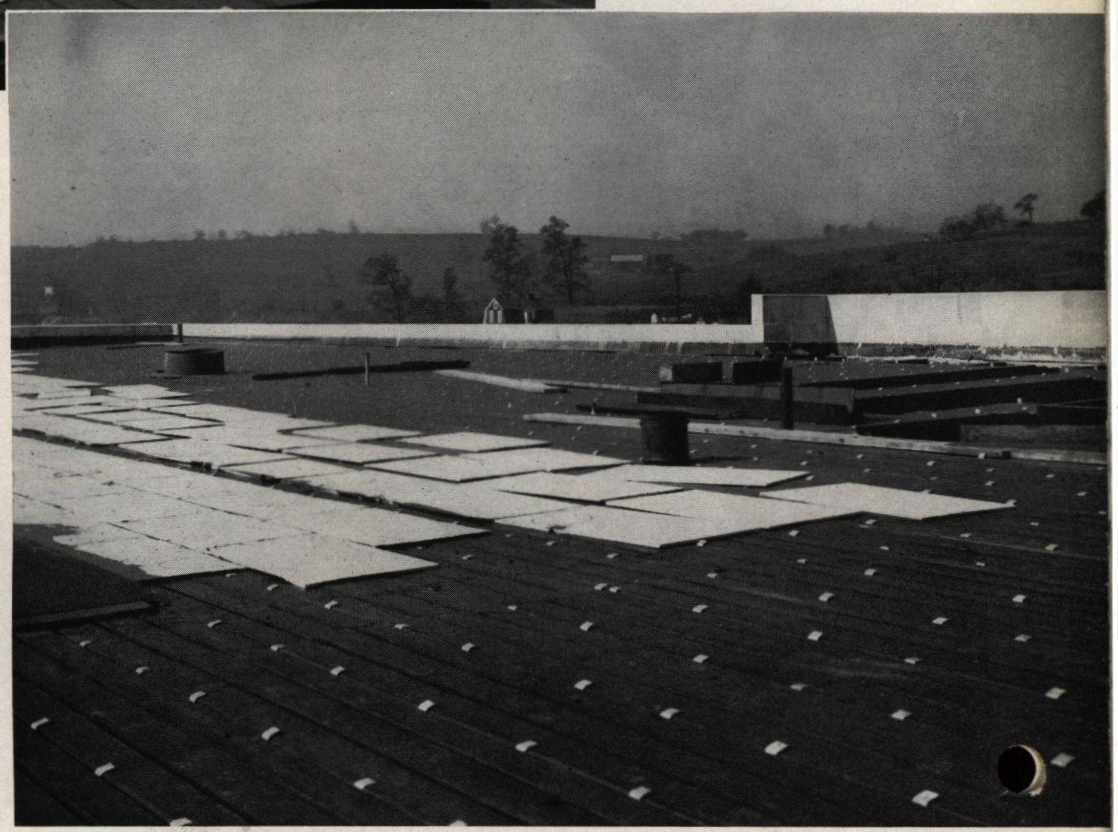


Illustration shows insulation being laid on Tri-Rib Roof Deck and made ready to receive built up roofing. Thousands of squares of this type roof are being used for all styles of modern buildings.

WHEELING TRI-RIB

STEEL ROOF DECKS

SPECIFICATIONS

Entire roof area shown on plans shall be covered with Wheeling Tri-Rib Roof Deck.

The Deck shall be formed of (COP-R-LOY Steel) or (Galvanized Steel) _____ gauge, having integral ribs of such size and shape to support a live load of _____ lbs. per square foot for purlin spacing shown on the drawings.

PAINTING

Roof Deck and Accessories, except Clips, to receive one coat of protective paint in shop before shipment. All Clips to be 18 gauge Galvanized Steel.

ERECTION

Roof Deck shall be erected and attached to the purlins by means of clips or welding. End laps shall not be less than 4'' and shall occur at the purlin points. Side laps shall be interlocked and fastened with clips, using one clip on spans up to 5'-0'' and two clips on spans exceeding 5'-0''.

INSULATION

Over entire area of Steel Deck, place one layer of insulation not less than 1/2'' thick. Insulation board shall be completely embedded in high temperature asphalt. Sheets shall be laid with joints broken and approximately 1/8'' apart. On sloping roofs 15° pitch or more, the insulation board over the Steel Deck shall be additionally secured to the Deck with clips.

If a second layer of insulation is required, it shall be embedded in asphalt and nailed to the first layer with 1'' long Large Headed Galvanized Barbed Felt Roofing Nails spaced at random about 15'' center to center, and at all edges not over 12'' center to center.

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WHEELING, W. VA.

NEW YORK
CHICAGO
PHILADELPHIA

ST. LOUIS
KANSAS CITY
COLUMBUS

DETROIT
BUFFALO
ATLANTA

LOUISVILLE
RICHMOND
MINNEAPOLIS

Form No. X-160

Printed in U. S. A.

Price List No. 105-B
Effective Nov. 2, 1931

DEALER PRICE LIST, TECHNICAL DETAILS AND ESTIMATING DATA ON USG STEEL ROOF DECKS

We present this folder to the USG Steel Roof Deck dealer to aid him to accurately and rapidly estimate costs on steel roof deck jobs, and to detail the list of materials required.

USG Steel Roof Decks are made to order for each job. When ordering USG Steel Roof Decks, state the number of pieces required, the length of the plates, the gauge of steel, and specify whether the plates are to be galvanized or painted.

The prices quoted herein are subject to discount. This will be given on application by writing direct, or through any of the USG sales offices.

UNITED STATES GYPSUM COMPANY
300 West Adams Street
CHICAGO

DEALER PRICE LIST FOR USG STEEL ROOF DECKS

SUBJECT TO CHANGE WITHOUT NOTICE
For 18" Wide Plates only

DECK PLATES	UNIT	PRICE F.O.B. CARS CHICAGO	SHIPPING WEIGHT
No. 22 Gauge Copper Alloy Deck, painted	100 Sq.Ft.	$10.35	200 Lbs.
No. 20 " " " " "	100 Sq.Ft.	11.60	240 Lbs.
No. 18 " " " " "	100 Sq.Ft.	14.30	320 Lbs.
No. 22 Gauge Copper Alloy Deck, galvanized	100 Sq.Ft.	$11.90	200 Lbs.
No. 20 " " " " "	100 Sq.Ft.	13.90	240 Lbs.
No. 18 " " " " "	100 Sq.Ft.	16.65	320 Lbs.

NOTE: Above prices do not include material for end laps.

CLIPS			
No. RD-1-B Purlin Clip 7"	M Pcs.	$28.00	285 Lbs.
No. RD-1-C Purlin Clip 5½"	M Pcs.	26.00	235 Lbs.
No. RD-2 Intermediate Clip (For Flat Roofs)	M Pcs.	14.00	130 Lbs.
No. RD-3 End Clip (For Pitched Roofs)	M Pcs.	14.00	130 Lbs.
No. RD-4 Intermediate Clip (For Pitched ")	M Pcs.	14.00	130 Lbs.

ACCESSORIES (Galvanized or painted) 10' Lengths.			
Ridge or Valley Plate-4" Wing-20 Ga. (Any Angle)	100 Lin.Ft.	$8.00	100 Lbs.
Cant Strip - 20 Gauge	100 Lin.Ft.	8.50	100 Lbs.
2-1/4" Cornice Bead (For 1/2" Insulation)	100 Lin.Ft.	9.60	100 Lbs.
2-3/4" Cornice Bead (For 1" Insulation)	100 Lin.Ft.	9.60	100 Lbs.

EXTRAS

Cutting Short Lengths (Less than three feet) or angle and curves (includes Waste) Per Cut $0.12

Detailing We do not provide engineering or detailing service. Dealer must furnish an accurate material list on each job, along with detail drawings if layout is necessary.

FREIGHT

USG Steel Roof Decks can be included in mixed carloads of Metal Lath, Channel, Corner Beads, Structural Steel, Bar Joists, etc. at the same freight rate.

Write for special prices on 6" and 12" widths.

Dealers are urged to write to nearest USG sales office for discount applying on the above prices. Descriptive literature and samples gladly furnished.

UNITED STATES GYPSUM COMPANY 300 West Adams Street* CHICAGO

TECHNICAL DETAILS OF USG STEEL ROOF DECKS

Made in three widths - 6", 12" and 18" (18" is standard)

Made in three steels - Copper Alloy Painted (Standard)
Copper Alloy Galvanized (Special)
Pure Iron Painted (Special)

Standard lengths - - - 3'0" to 7'6" long in 3" increments
8'0" to 10'0" long in 6" increments
Also 10'3" length.

Made in three gauges	Weight	Allowable spans
No. 22 Gauge (Special)	2.00 Lbs. per Sq.Ft.	Up to 6'0"
No. 20 Gauge (Standard)	2.40 Lbs. per Sq.Ft.	Up to 7'0"
No. 18 Gauge (Special)	3.17 Lbs. per Sq.Ft.	7'0" to 8'0"

CLIPS MADE FROM ELECTRO GALVANIZED STEEL

No. RD-1-B Purlin Clip - 7" (For I-Beam Purlins)
No. RD-1-C Purlin Clip - 5½" (For Channel Purlins or Bar Joists)
No. RD-2 Intermediate Clip (For Flat Roofs)
No. RD-3 End Clip (For Pitched Roof)
No. RD-4 Intermediate Clip (Attaches Insulation to Pitched Roof)

STANDARD ACCESSORIES (PAINTED OR GALVANIZED)

Ridge or Valley Plate (any angle) - 20 Gauge - 4" Wing)

Cornice Bead 2-1/4" For 1/2" of Insulation
2-3/4" For 1" of Insulation

Cant Strip - 20 Gauge.

STOCK ITEMS

For the present steel will be stocked for the following items only.

No. 20 Gauge Copper Alloy Steel - painted - for 18" width only.

Lengths 5'6" to 7'6" in 3" increments and 10' and 10'3".

(Shipment of stock items requires approximately one week from receipt of order and details.)

All other lengths, widths, gauges or kinds of steel are special and may require extra time for purchase of steel and fabrication.

NOTES

All steel decks will be manufactured especially for each job after receipt of order and details.

Insulation Board is required over steel decks when used on enclosed or heated structures to prevent condensation of moisture under deck.

ESTIMATING DATA FOR USG STEEL ROOF DECKS

PERCENTAGE OF WASTE FOR FOLLOWING LAPS

LENGTH	2"	2½"	3"	3½"	4"
4'	4.2	5.2	6.2	7.3	8.3
4'6"	3.7	4.6	5.6	6.4	7.4
5'	3.3	4.2	5.0	5.8	6.6
5'6"	3.0	3.8	4.5	5.3	6.1
6'	2.8	3.5	4.2	4.9	5.6
6'6"	2.6	3.2	3.8	4.5	5.1
7'	2.4	3.0	3.6	4.2	4.7
7'6"	2.2	2.8	3.3	3.9	4.4
8'	2.1	2.6	3.1	3.6	4.2
8'6"	2.0	2.4	2.9	3.4	3.9
9'	1.9	2.3	2.8	3.2	3.7
9'6"	1.8	2.2	2.6	3.1	3.5
10'	1.7	2.1	2.5	2.9	3.3

APPROXIMATE NUMBER OF CLIPS REQUIRED FOR 100 SQ. FT. OF 18 INCH ROOF DECK

SPAN	NO.1 PURLIN CLIPS (B OR C)	NO. 2 OR 4 INT. CLIPS
4'	18	36
4'6"	16	32
5'	14	29
5'6"	13	27
6'	12	36
6'6"	11	33
7'	11	31
7'6"	10	29
8'	10	27
8'6"	9	25

DEALERS ESTIMATING COST DATA

DECKS	APPROXIMATE COST F.O.B. CARS CHICAGO	UNIT	WEIGHT
No. 22 gauge painted Copper Alloy	$11.50	per square	200 Lbs.
No. 20 " " " "	12.85	" "	240 Lbs.
No. 18 " " " "	15.70	" "	320 Lbs.
No. 22 gauge galv. Copper Alloy	$13.35	per square	200 Lbs.
No. 20 " " " "	15.25	" "	240 Lbs.
No. 18 " " " "	18.00	" "	320 Lbs.

ACCESSORIES - Painted or Galvanized

Valley or Ridge Plate	$ 8.00	100 lin. ft.	100 Lbs.
Cant Strip	8.50	" " "	100 "
Cornice Bead	9.60	" " "	100 "

CUTTING - (Short lengths under three feet) or angles or curves. (Includes waste) $0.12 per cut.

All above prices are F.O.B. cars Chicago, and apply to 18" wide deck only.

NOTE

The above list is furnished by the United States Gypsum Company as a courtesy to assist the dealer in estimating roof deck jobs. The above figures on decks represent the total cost of 100 sq. ft. of roof decking plus 4% for end laps plus 12 purlin clips, plus 30 intermediate clips, of the ordinary requirements for one square of roof surface.

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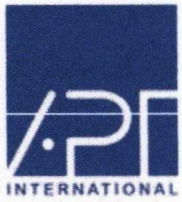

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